INLAND FOUNDATION ENGINEERING, INC.
Consulting Geotechnical Engineers and Geologists
www.inlandfoundation.com

November 19, 2019
Project No. E080-054

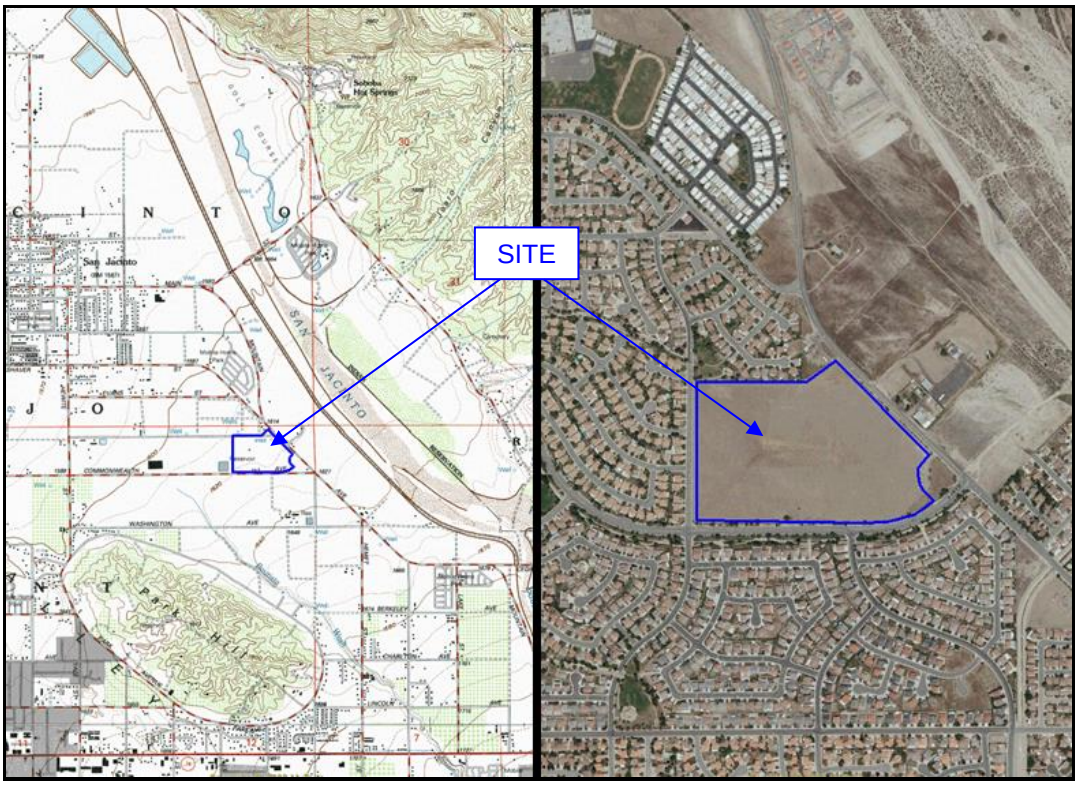
Attention: Reza Toorzani, P.E.
ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC,

1861 West Redlands Boulevard
Redlands, California 92373

Re: Subsurface Sampling and Materials Testing
Proposed Borrow Area
SWC Ramona Expressway and Esplanade Avenue
San Jacinto, California

Dear Mr. Toorzani:

At your request, Inland Foundation Engineering, Inc. (IFE) has conducted subsurface sampling at the referenced site, to obtain representative soil samples for laboratory testing.



U.S.G.S. Topographic Map, San Jacinto 7.5' Quadrangle, and Aerial Photograph (2016)

PROJECT UNDERSTANDING and SCOPE OF SERVICE

We understand that the Soboba Band of Luiseno Indians is interested in obtaining excavated soils generated from a proposed groundwater recharge area to be graded in the near future. IFE was requested to conduct subsurface sampling at five selected areas within the proposed borrow area to characterize the materials. The following construction plans were provided to us for this project:

- Eastern Municipal Water District, Mountain Avenue West Replenishment Basin, Spec. 1361W, prepared by Dudek, dated June 17, 2019.

Our scope of service for this project included:

- Subsurface geotechnical exploration and bulk soil sampling at five locations on the site.
- Visual logging and classification of soils by a field geologist per the Uniform Soil Classification System.
- Obtain representative bulk soil samples and transport to our laboratory for testing
- Laboratory testing including sieve analysis, sand equivalent, corrosivity (pH, sulfates, chlorides, and resistivity), and organic content.

FIELD EXPORATION

Five exploratory trenches were excavated on the site by your contractor on November 6, 2019. The depth of the trenches ranged from approximately 9.5 feet to 12 feet below the existing ground surface. A field geologist logged the soils at each location per the Uniform Soil Classification System. Logs of the soil encountered within the trenches are presented on Figure Nos. A-2 to A-6. Representative bulk soil samples were obtained and transported to our laboratory for further testing. The approximate locations of the exploratory trenches are shown on Figure A-7.

LABORATORY TESTING

Laboratory testing was be performed on selected bulk samples to classify and evaluate the soils. Based on discussions with you, and our proposal of November 5, 2019, our laboratory testing program included the following.

Laboratory Test	No. of Tests
Sieve Analysis	10
Sand Equivalent	10
Corrosivity (pH, sulfates, chlorides, and resistivity)	10
Organic Content	5

Sieve Analysis Testing

Sieve analysis testing was conducted on 10 samples per ASTM D6913 test method. The gradation testing results are presented on Figure Nos. B-1 and B-2. This testing indicates that the samples tested are predominately granular. Fines content (percent passing #200 sieve) of the tested samples ranged from approximately 12 to 46 percent.

Sand Equivalent Testing

Sand equivalent test was conducted per ASTM D2419, values ranged from 11 to 69 as shown in the following table.

Trench No.	Depth (ft.)	SE
TR-01	0.0-2.5	11
TR-01	5.5-8.5	15
TR-02	2.3-6.0	19
TR-02	8.0-12.0	69
TR-03	0.0-4.3	15
TR-03	4.3-12.0	51
TR-04	0.0-1.3	12
TR-04	7.5-10.0	22
TR-05	0.0-2.5	23
TR-05	4.5-8.3	13

Corrosivity Testing

Corrosivity testing (pH, sulfates, chlorides, and resistivity) was conducted per ASTM and Caltrans test methods on 10 samples. A summary of this analytical testing is shown on the following table.

Sample Location	Sample Depth (ft.)	Water-Soluble Sulfates (%) CT 417	Chlorides (ppm) CT 422	Minimum Resistivity (ohm-cm) ASTM G57	pH CT 643
TR-01	0.0-2.5	0.018	120	1,800	6.9
TR-01	5.5-8.5	0.017	270	1,500	7.0
TR-02	2.3-6.0	0.008	240	1,600	7.1
TR-02	8.0-12.0	<0.001	270	4,000	6.9
TR-03	0.0-4.3	<0.001	300	1,600	6.6
TR-03	4.3-12.0	<0.001	180	7,700	7.0
TR-04	0.0-1.8	0.008	330	1,500	7.0
TR-04	7.5-10.0	<0.001	300	2,200	6.9
TR-05	0.0-2.5	0.005	150	4,000	7.2
TR-05	4.5-8.3	<0.001	180	1,300	7.2

Organic Content Testing

Organic content testing was performed on five samples per ASTM D2974. The following table presents the result of the organic content testing:

Sample Location	Sample Depth (ft.)	Organic Matter Content (%)
TR-01	0.0-2.5	1.1
TR-02	2.3-6.0	1.6
TR-03	0.0-4.3	1.4
TR-04	0.0-1.8	1.6
TR-05	4.5-8.3	1.9

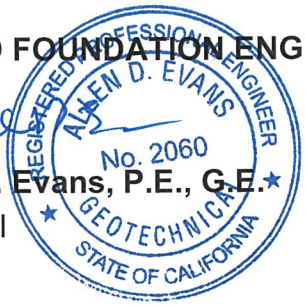
These test results relate only to those items tested. The sampling and laboratory testing presented is not intended to be a comprehensive characterization of subsurface materials or conditions.

Partial reproduction of the report is strictly forbidden. Testing for the presence of hazardous wastes/materials was not within our scope of services. The data presented in this report are for the use of Engineering Resources of Southern California, Inc. only and may not be reproduced or used by others without written approval of Inland Foundation Engineering, Inc. The laboratory testing was performed in accordance with the appropriate methodology as well as contemporary principals and practice. We make no other warranty, either express or implied.

We appreciate the opportunity to be of service to you. Please contact this office if you have any questions.

Respectfully,

INLAND FOUNDATION ENGINEERING, INC.



Allen D. Evans, P.E., G.E.
Principal

DRL:ADE:es
Addressee (1)

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487)

PRIMARY DIVISIONS			GROUP SYMBOLS		SECONDARY DIVISIONS
COARSE GRAINED SOILS – MORE THAN HALF OF MATERIALS IS LARGER THAN #200 SIEVE SIZE	GRAVELS – MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN) 5% FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS – MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN) 5% FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM		SILTY SANDS, SAND-SILT MIXTURES
			SC		CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS – MORE THAN HALF OF MATERIALS IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS – LIQUID LIMIT IS LESS THAN 50		ML		INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS – LIQUID LIMIT IS GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT		PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS
TYPICAL FORMATIONAL MATERIALS	SANDSTONES		SS		
	SILTSTONES		SH		
	CLAYSTONES		CS		
	LIMESTONES		LS		
	SHALE		SL		

CONSISTENCY CRITERIA BASES ON FIELD TESTS

RELATIVE DENSITY – COARSE – GRAIN SOIL

RELATIVE DENSITY	SPT * (# BLOWS/FT)	RELATIVE DENSITY (%)
VERY LOOSE	<4	0-15
LOOSE	4-10	15-35
MEDIUM DENSE	10-30	35-65
DENSE	30-50	65-85
VERY DENSE	>50	85-100

CONSISTENCY – FINE-GRAIN SOIL

		TORVANE	POCKET ** PENETROMETER
CONSISTENCY	SPT* (# BLOWS/FT)	UNDRAINED SHEAR STRENGTH (tsf)	UNCONFINED COMPRESSIVE STRENGTH (tsf)
Very Soft	<2	<0.13	<0.25
Soft	2-4	0.13-0.25	0.25-0.5
Medium Stiff	4-8	0.25-0.5	0.5-1.0
Stiff	8-15	0.5-1.0	1.0-2.0
Very Stiff	15-30	1.0-2.0	2.0-4.0
Hard	>30	>2.0	>4.0

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM -1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ.FT. READ FROM POCKET PENETROMETER

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbled or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

EXPLANATION OF LOGS

LOG OF TRENCH Tr-01

GROUND ELEVATION **+/-** LOGGED BY **FWC**

EXCAVATION METHOD **Backhoe** DATE EXCAVATED **11/6/19**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0	SC-SM		**SILTY, CLAYEY SAND,** very fine- to fine-grained, olive-brown, slightly moist to moist, medium dense.						
	SP-SM		**SAND with SILT,** fine- to medium-grained, gray-brown, slightly moist, medium dense.						
	SM		**SILTY SAND,** with trace clay, very fine- to fine-grained, gray-brown, moist, medium dense.						
5	SC		**CLAYEY SAND,** very fine- to fine-grained, olive, moist, medium dense.						
	SM		**SILTY SAND,** fine- to medium-grained, olive, moist, medium dense, interbedded with sand .						
10	SW		**SAND,** fine- to coarse-grained, olive-gray, slightly moist, medium dense, heavy caving.						
			End of trench at 12 feet. No groundwater or mottling encountered.						

Inland Foundation Engineering, Inc.

CLIENT **Engineering Resources**

PROJECT NAME **Subsurface Sampling**

PROJECT LOCATION **SWC Ramona Exp. & Esplanade Ave.**
San Jacinto, CA

PROJECT NUMBER **E080-054**

FIGURE NO. A-2

OLD IFE TRENCH - GINT STD US LAB.GDT - 11/19/19 14:22 - P:\E080\E80-054 BORROW AREA. SJ\GINT.GPJ

LOG OF TRENCH Tr-02

GROUND ELEVATION **+/-** LOGGED BY **FWC**

EXCAVATION METHOD **Backhoe** DATE EXCAVATED **11/6/19**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0	SC		**CLAYEY SAND,** very fine- to fine-grained, gray-brown, slightly moist to moist, loose.						
5	SM		**SILTY SAND,** with trace clay, fine- to medium-grained, olive, moist, medium dense.						
	SP-SM		**SAND with SILT,** fine- to medium-grained, light olive, slightly moist, medium dense.						
10	SP-SM		**SAND with SILT,** fine- to very coarse-grained, olive-gray, slightly moist, medium dense, heavy caving.						
			End of trench at 12 feet. No groundwater or mottling encountered.						

Inland Foundation Engineering, Inc.

CLIENT **Engineering Resources**

PROJECT NAME **Subsurface Sampling**

PROJECT LOCATION **SWC Ramona Exp. & Esplanade Ave.**
San Jacinto, CA

PROJECT NUMBER **E080-054**

FIGURE NO. A-3

LOG OF TRENCH Tr-03

GROUND ELEVATION **+/-** LOGGED BY **FWC**

EXCAVATION METHOD **Backhoe** DATE EXCAVATED **11/6/19**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0	SM		**SILTY SAND,** with trace clay, very fine- to fine-grained, olive-brown, moist, loose.						
5	SM		**SILTY SAND,** with trace clay, fine- to medium-grained, olive-brown, moist, loose to medium dense, with thin interbeds of clayey sand, sandy silt, and sand.						
10			End of trench at 12 feet. No groundwater or mottling encountered.						

Inland Foundation Engineering, Inc.

CLIENT **Engineering Resources**

PROJECT NAME **Subsurface Sampling**

PROJECT LOCATION **SWC Ramona Exp. & Esplanade Ave.**
San Jacinto, CA

PROJECT NUMBER **E080-054**

FIGURE NO. A-4

OLD IFE TRENCH - GINT STD US LAB.GDT - 11/19/19 14:22 - P:\E080\E80-054 BORROW AREA SJ\GINT.GPJ

LOG OF TRENCH Tr-04

GROUND ELEVATION **+/-** LOGGED BY **FWC**

EXCAVATION METHOD **Backhoe** DATE EXCAVATED **11/6/19**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0	SC-SM		**SILTY, CLAYEY SAND,** very fine- to fine-grained, olive-brown, moist, medium dense.						
	SC		**CLAYEY SAND,** very fine- to fine-grained, dark olive, moist, loose.						
5	SM		**SILTY SAND,** fine- to medium-grained, olive, moist, loose to medium dense.						
	SW		**SAND,** fine- to coarse-grained, light olive, slightly moist, loose to medium dense, with very thin interbeds of silt and clay.						
	SM		**SILTY SAND,** very fine- to fine-grained, olive, slightly moist to moist, stiff, interbedded with silt with sand						
10	ML		**SANDY SILT,** with clay, very fine- to fine-grained, dark olive-brown, moist, stiff.						
			End of trench at 12 feet. No groundwater or mottling encountered.						

Inland Foundation Engineering, Inc.

CLIENT **Engineering Resources**

PROJECT NAME **Subsurface Sampling**

PROJECT LOCATION **SWC Ramona Exp. & Esplanade Ave.**
San Jacinto, CA

PROJECT NUMBER **E080-054**

FIGURE NO. A-5

LOG OF TRENCH Tr-05

GROUND ELEVATION **+/-** LOGGED BY **FWC**

EXCAVATION METHOD **Backhoe** DATE EXCAVATED **11/6/19**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0	SC-SM		**SILTY, CLAYEY SAND,** very fine- to fine-grained, olive-brown, moist, loose to medium dense.						
	SP-SM		**SAND with SILT,** fine- to coarse-grained, olive-gray, slightly moist, medium dense.						
5	SM		**SILTY SAND,** with trace clay, very fine- to fine-grained, olive-brown, moist, medium densef, interbedded with sandy silt.						
	SW		**SAND,** fine- to coarse-grained, light olive, slightly moist, medium dense, heavy caving.						
			End of trench at 9.5 feet. No groundwater or mottling encountered.						

Inland Foundation Engineering, Inc.

CLIENT **Engineering Resources**

PROJECT NAME **Subsurface Sampling**

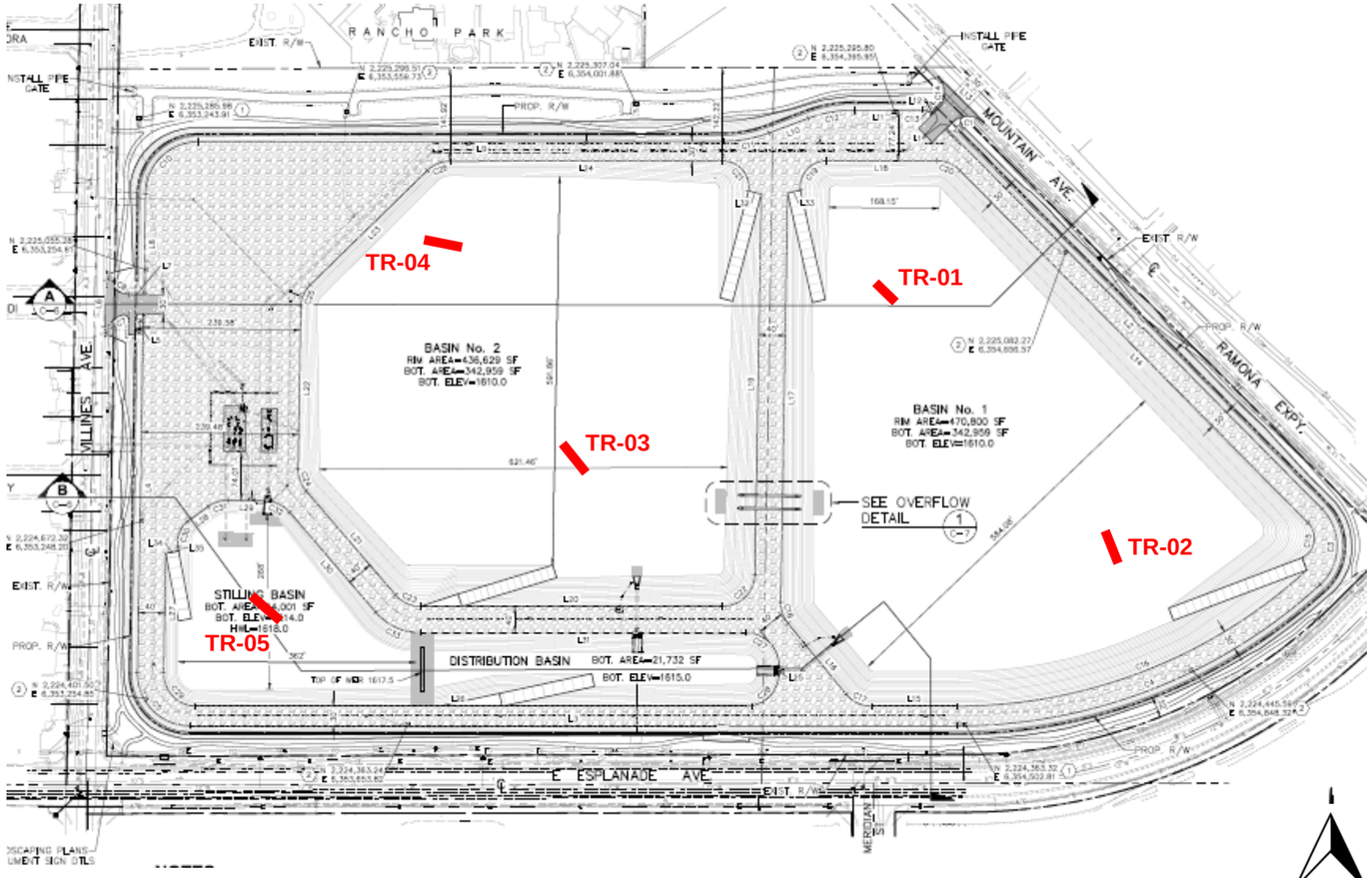
PROJECT LOCATION **SWC Ramona Exp. & Esplanade Ave.**
San Jacinto, CA

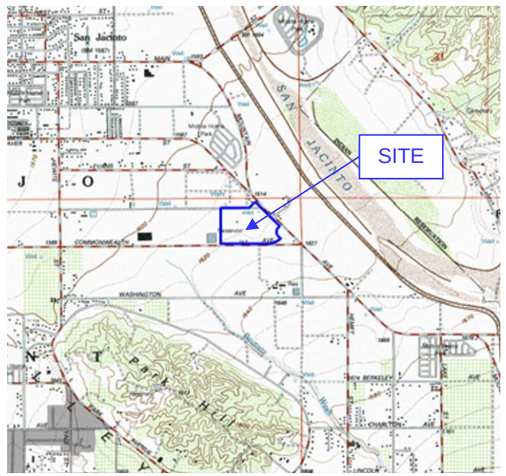
PROJECT NUMBER **E080-054**

FIGURE NO. A-6

OLD IFE TRENCH - GINT STD US LAB.GDT - 11/19/19 14:22 - P:\E080\E80-054 BORROW AREA, SJ\GINT.GPJ

SITE PLAN





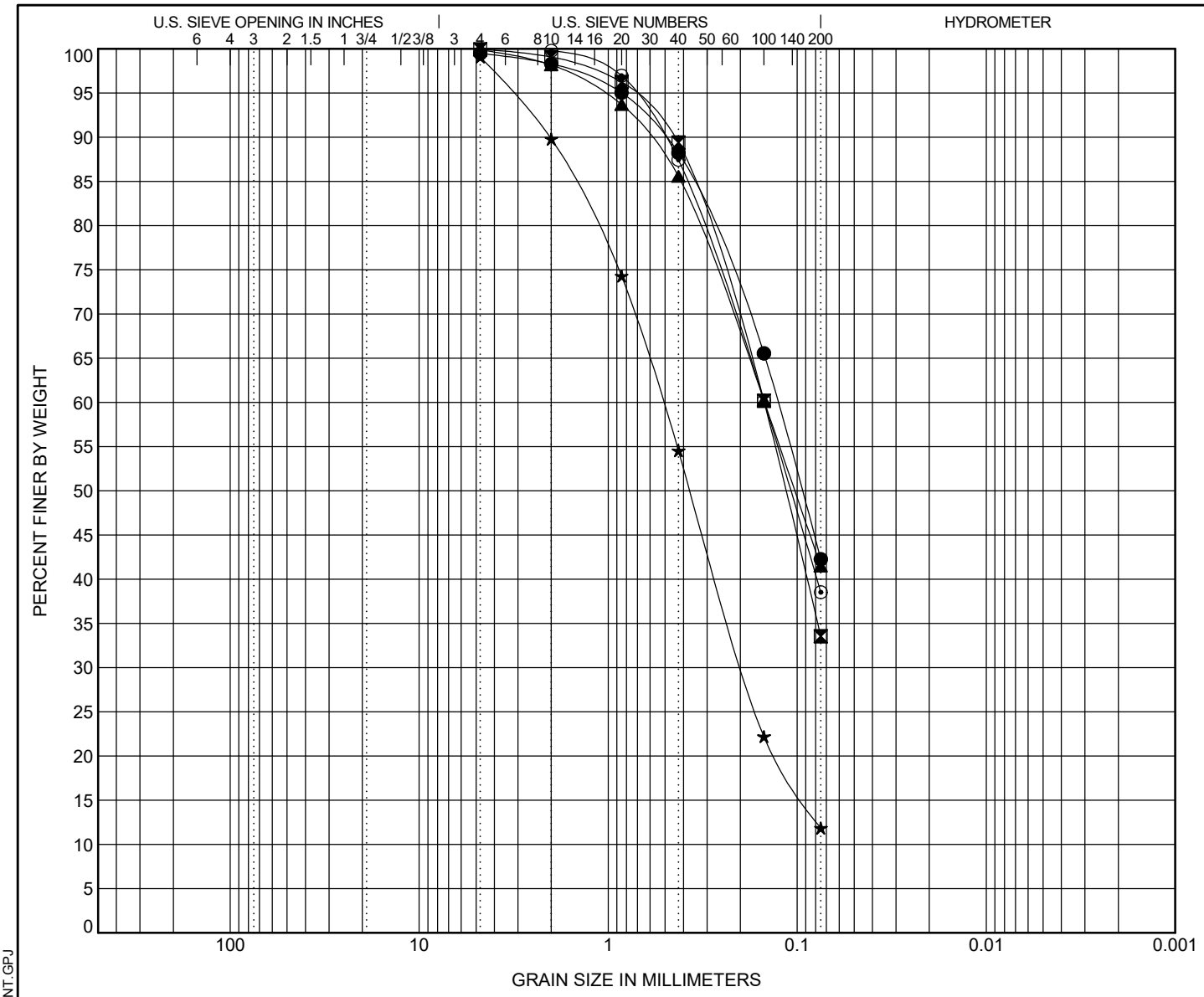
Vicinity Map

Approximate Location of Exploratory Trench

Base Map: Eastern Municipal Water District, Mountain Avenue West Replenishment Basin, Spec. 1361W, prepared by Dudek, dated June 17, 2019.

INLAND FOUNDATION ENGINEERING, INC. ***Consulting Geotechnical Engineers and Geologists*** ***www.inlandfoundation.com*** ***(951) 654-1555***		
A-7	Materials Sampling and Testing NWC Ramona Expy. and Esplanade Ave. San Jacinto, California	
	Drawn By: DRL	Project No. E080-054
	Scale: NTS	Date: Nov. 2019

APPENDIX B



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	Tr-01	0.0	SILTY, CLAYEY SAND (SC-SM)					
⊠	Tr-01	5.5	SILTY SAND (SM)					
▲	Tr-02	2.3	SILTY SAND with trace clay (SM)					
★	Tr-02	8.0	SAND with SILT (SP-SM)				1.09	7.77
⊙	Tr-03	0.0	SILTY SAND with trace clay (SM)					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	Tr-01	0.0	4.75	0.127				57.2	42.3	
⊠	Tr-01	5.5	4.75	0.149				66.4	33.6	
▲	Tr-02	2.3	4.75	0.149				58.4	41.5	
★	Tr-02	8.0	4.75	0.515	0.193			87.2	11.9	
⊙	Tr-03	0.0	2	0.149				61.2	38.5	

GRADATION CURVES (ASTM D422, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-1

CLIENT Engineering Resources

PROJECT NAME Subsurface Sampling

PROJECT NUMBER E080-054

PROJECT LOCATION SWC Ramona Exp. & Esplanade Ave.
San Jacinto, CA

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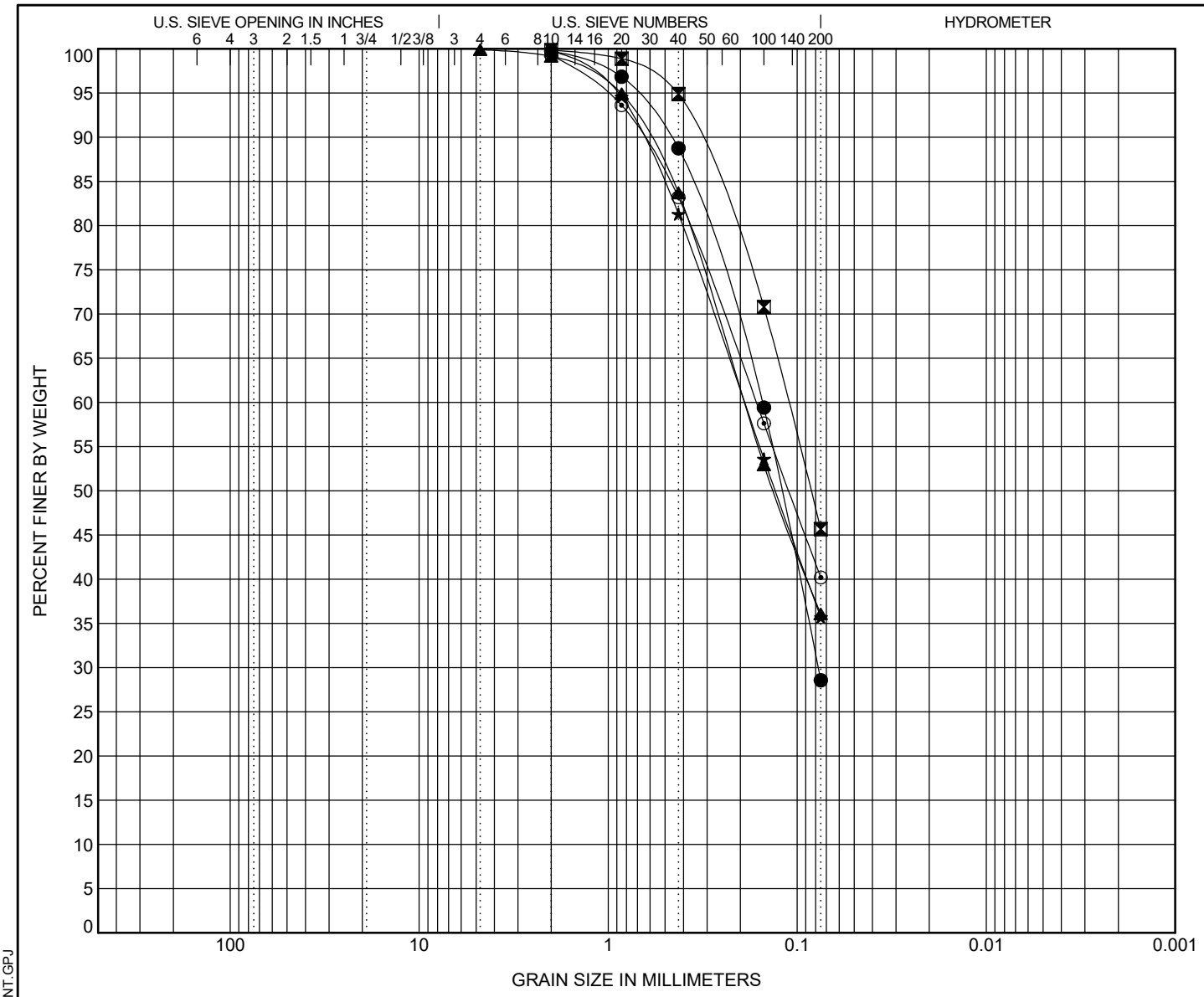

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**Tr-03**	**4.3**	**SILTY SAND (with trace clay SM)**					
⊠	**Tr-04**	**0.0**	**SILTY, CLAYEY SAND (SC-SM)**					
▲	**Tr-04**	**7.5**	**SILTY SAND (SM)**					
★	**Tr-05**	**0.0**	**SILTY, CLAYEY SAND (SC-SM)**					
⊙	**Tr-05**	**4.5**	**SILTY SAND with trace clay (SM)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**Tr-03**	**4.3**	**2**	**0.153**	**0.077**			**71.2**	**28.6**	
⊠	**Tr-04**	**0.0**	**2**	**0.111**				**54.2**	**45.7**	
▲	**Tr-04**	**7.5**	**4.75**	**0.191**				**63.8**	**36.1**	
★	**Tr-05**	**0.0**	**2**	**0.191**				**64.1**	**35.7**	
⊙	**Tr-05**	**4.5**	**2**	**0.165**				**59.0**	**40.2**	

GRADATION CURVES (ASTM D422, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-2

CLIENT Engineering Resources

PROJECT NAME Subsurface Sampling

PROJECT NUMBER E080-054

PROJECT LOCATION SWC Ramona Exp. & Esplanade Ave.
San Jacinto, CA

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